Ashraf Atalla, PhD
#704 - Bonner Rd.
Mississauga, ON L5J 2C7, Canada
Phone: +1 (905) 537 - 6143
atalla.ashraf@gmail.com

May 15, 2010

Dr. Kristin R. Swanson
Department of Pathology
Department of Applied Mathematics
University of Washington
Seattle, WA 98195

Dear Dr. Swanson,

I am writing to apply for the position of of Research Scientist at Swanson Lab, University of Washington-Seattle. I completed my PhD in Electrical and Computer Engineering from McMaster University in August 2010. I believe that my academic background and my work experience as an electrical design and research engineer prepare me to be an effective researcher and instructor in your department.

As a teaching assistant, I have gained valuable experience leading undergraduate sections and labs for both electrical and biomedical majors. In addition, I have advised Master's students on appropriate research topics and edited and evaluated their work.

My doctoral dissertation was conducted under the direction of Prof. Aleksandar Jeremic, and looks at the use of relatively new methodologies for modeling and analysis of diffusion and stochastic processes and its applications to biomedical engineering. More specifically, I have designed a diffusion-reaction model for detecting the low diffusivity regions in the heart using ECG/MCG data. This work included development of computational models for the electrical activation of the heart, at which I extended FitzHugh-Nagumo equations to account for spatially dependent diffusivity and derived inverse models that can be used in estimating diffusivity of the heart (i.e., mobility of ions) as well as detect and localize activation points in the myocardium.

My most recent research includes modeling of capillary exchange process using stochastic flow model with Fokker-Planck equations, at which I achieved an efficient algorithm that can be used to model highly complex capillary networks.

During the past two years, I have worked as an electrical engineer at Voith Siemens Inc. at which, I have gained excellent industrial experience in modeling and design of electrical systems and customer designed devices. Moreover, I conducted considerable research in developing

the electromagnetic analysis program at Voith. This included electromagnetic interference and power electronics integration of variable speed generators and power devices. Also, I have developed project specific custom software solutions for the Siemens PCS7 or Allen Bradley platforms as required meet unique and specific requirements at each new plant.

My scholarly interests range widely, from electrical to biomedical engineering. My research appears in PIERS journal, IEEE Transactions on Signal Processing (to appear), and Journal of Applied Mathematics (to appear) as well as various prestigious conferences including CCECE 2009, ICASSP 2008, BIOSIGNALS 2008, and COMSOL conferences. Currently, I have one journal paper under revision in Physical Review E.

I welcome an opportunity to have a personal interview with you. I have enclosed my curriculum vitae. I am confident that I will be an ideal candidate for this position, as I have both the academic and industrial experience and I am eagerly interested in pursuing my future research in mathematical modeling and implementation in biomedical engineering. I look forward to hearing from you soon.

Sincerely,

Ashraf Atalla

Ashraf Atalla

Personal Data

Address: 704 - 2360 Bonner Rd, Mississauga, ON, Canada L5J 2C7
Cell: (905) 537-6143
email: atalla.ashraf@gmail.com

Education

Aug 2010 | Doctor of Philosophy in Electrical and Computer Engineering, **McMaster University**, Canada
Thesis: "Modeling and Inverse Techniques in Diffusion Processes"
Advisor: Prof. Aleksandar Jeremic
Gpa: 4/4

Aug 2005 | Master of Science in Electrical Power and Machines, **Cairo University**, Egypt
Thesis: "Boundary Element Analysis of Linear Time-Harmonic Three Dimensional Eddy Current problems"
Advisor: Tharwat Fawzi
Gpa: 94.75/100

July 2002 | Bachelor Degree in Electrical Power and Machines, **Cairo University**, Egypt
Thesis: "Automation and Control of Water Distillation Plants using PLC and SCADA Systems"
Advisor: Ahmed Bahgat
Gpa: 92.73/100

Areas of Interest

Biomedical Modeling & Signal Processing
Mathematical Modeling of Physical Systems
Numerical Methods in Electromagnetics
Electrical Machines and Drives
Power Electronics & Power Systems
Stochastic Modeling and Analysis

Professional Experience

Feb 2010 – Present | Electrical Design & Research Engineer, **Voith Siemens**, Canada

Control Systems:

- Developed project specific custom software solutions for the Siemens PCS7 or Allen Bradley platforms and taylor project template configurations as required meeting unique and specific requirements at each new plant.
- Created documentation unique for each plant to aid future system maintenance. Record all variances using the approved department tools to maintain strict revision control of all software modules.
- Established applications as required to communicate data between the hydro plant control system and a remote dispatch center. Provide test software and assist Factory Acceptance Testing activity after cabinet assembly is complete.

Hydro Generator Design

- Handled the electrical scope, technical data and drawing support for generator proposals offered by the Company.
- Provided technical guidance consistent with good engineering practice to Sales/Marketing in the proposal phase of a project through technical reviews of customer specs equipment assessments & evaluations during site visits.
- Prepared technical datasheets required for solicitation of generator design support and equipment proposals from other Voith Hydro operating units.
- Prepared preliminary basic designs and layouts for generator electrical components such as bars, coils, poles bodies, leads and bus.
- Performed generator uprate studies to determine electrical limitations of existing generator configurations.
- Set up studies and numerical simulations to improve coil insulation system.
- Increased profit by optimizing coil design through project-specific electromagnetic studies in order to reduce the overall losses an increase the thermal conductivity of stator windings.

Electromagnetic and Power Electronics Research

- Conducted power converter research with a focus on electromagnetic design and integration issues.
- Established applied research in the field of advanced power electronics integration for variable speed generators in wind turbine.
- Started electromagnetic field and circuit simulations and measurements for hydro generators and wind turbine asynchronous generators.
- Investigated design concepts for improving electromagnetic compatibility (EMC) and reducing electromagnetic interferences (EMI).

Sept 2005 – Aug 2010 | Teaching and Research Assistant, **McMaster University**, Canada

Research Assistant

- Developed models and computer codes for the simulation of different stochastic processes and the detection of source/geometry properties.
- Provided a new technique for estimating the ore volume in AC smelting furnaces using Finite-Element analysis of surface current density.
- Designed algorithms for localizing and estimating source and boundary properties using stochastic differential equations.
- Produced Finite Element models (including the design of FE Meshes and PDE's) for human torso, heart, capillary networks, and smelting furnaces.
- Introduced algorithms for the localization of low conductivity regions in the heart Using ECG/MCG sensor arrays.
- Modeled the capillary exchange process and drug delivery through the capillary network.
- Designed algorithm for detection and localization of activity regions in the human brain.

Teaching Assistant

- Served as a teaching assistant for: Electromagnetic Fields, Electric Circuits and Systems, Modeling of Biomedical Systems, Statistics and Probabilities, Power Electronics & Machines.
- Lead TA for the Electromagnetic Lab.

Sept 2002 – Aug 2005 | Teaching and Research Assistant, **Cairo University**, Egypt

Research Assistant

Developed full Boundary Element code for modeling the eddy currents for user-designed geometries. Applied for calculations of the power spectrum, current/field distribution, and magnetization curves of selected magnetic materials.

Teaching Assistant

- Served as a teaching assistant for: Electromagnetic Fields, Measurements and Calibration, Power Electronics, Electrical Machines & Transformers, Electric Circuits and Systems.
- Lead TA for the Electrical Machines & Transformer Labs.
- Lead TA for the Control Systems Lab.

Oct 2002 – Sept 2004 | Design Engineer, **Foxboro**, Egypt

- Designed custom solutions for fire alarm systems.
- Provided project specific turbo generator emergency systems.
- Prepared technical documentations for proposals and system manuals.
- Established PLC and SCADA systems for automation of water distillation plants.

May 2001 – Sept 2001 | Control Systems Engineer, **Nikola Tesla Power Plant**, Serbia

Received practical training on operating and monitoring of power plants and the dynamics of turbo generators and switch gear station.

May 2000 – Sept 2000 | Summer Intern, **Electromagnetic Lab, Cairo University**, Egypt

- Developed numerical codes for solving electromagnetic induction problems using FD and FE methods.
- Designed a commercial code to design AC induction motors as well as single and three-phase transformers.

May 1999 – Sept 1999 | Summer Intern,**Control Systems Lab, Cairo University**, Egypt

- Developed various PLC/SCADA systems using Siemens & Allen-Bradley modules.
- Implemented fuzzy logic and neural networks control systems for the control of robotic arm.
- Received training on the design of DC and induction machines drives.
- Designed a fuzzy logic controller, motor control circuits, and a system & tracking system that has been used to detect and track a light beam within a certain frequency range.

Scholarships and Awards

2005-2010 Scholarship for graduate students, **McMaster University**, Canada. ($ 27,000 annually)

July 2002 Dean's award for the best GPA in the undergraduate program, **Cairo University**, Egypt. ($ 5,000)

July 2002 Honors Mention for thesis project, **Cairo University**, Egypt. ($ 2,000, received an offer from Foxboro, Egypt as a result of very positive review.)

Sept 2001 Top Intern Award, **Nikola Tesla Power Plant**, Serbia. ($ 1,000)

July 1997 Governmental Award for outstanding students in the Secondary School, UAE. ($ 7,000)

Technical Skills

Matlab experience:	linear algebra, Fourier transforms, nonlinear numerical methods, polynomials, statistics
Matlab toolboxes:	control systems, power systems, filter design, signal processing.
Instrumentation:	PLC modules (Siemens & Allen-Bradley), Simulink, LabVIEW.
Programming:	C/C++, Java, Matlab, Fortran, ASCII coding.
Software Packages:	COMSOL Multiphysics, SolidEdge, 3D MAX, WinCC, SCADA, AutoCAD, Photoshop.

Applications:	LaTeX, Microsoft Office, and other common productivity packages for Windows and OS X.
Operating Systems:	Microsoft Windows, Apple OS X, and UNIX.

Presentations

Oct 2010	New Developments of Electromagnetic Design in Renewable Energy, Voith Industrial, Heidenhiem, Germany.
Dec 2009	Modeling and Inverse Techniques in Diffusion Problems, Cleveland Clinic, Cleveland, OH, USA.
Nov 2008	Estimation of Boundary Properties Using Stochastic Differential Equations, Washington University, St. Louis, MO, USA.
Aug 2008	Predicting the Length of Stay for Neonates Using Heart-Rate Markov Models, EMBC 2008, Vancouver, BC, Canada.
March 2008	Localization of Chemical sources Using Stochastic Differential Equations, ICASSP 2008, Las Vegas, NV, USA.
Jan 2008	An Inverse Model for Localization of Low-diffusivity Regions in the Heart Using ECG/MCG Sensor Arrays, BIOSTEC 2008, Funchal, Madeira, Portugal.

Professional Memberships

IEEE member, 2003 - present
Engineer-in-Training (EIT), (P.Eng licences expected July, 2011)
The Chess Federation of Canada, member, 2006 - present

Publications

Journal Papers

A. Atalla and A. Jeremic, *"An Inverse Model for Localization of Low-diffusivity Regions in the Heart Using ECG/MCG Sensor Arrays"*, Progress In Electromagnetics Research Symposium Proceedings, PIERS 2008, pp 630-635, 2008.

A. Jeremic and A. Atalla, *"Estimating the Ore Volume in AC Smelting Furnaces Using Finite-Element Analysis of Surface Current Density"*, Progress In Electromagnetics Research Symposium Proceedings, PIERS 2009.

A. Atalla and A. Jeremic, *"Localization of Diffusive sources Using Stochastic Differential Equations"*, IEEE Trans. Signal Processing. *(to appear)*

A. Atalla, A. Jeremic and A. Nehorai, *"Estimation of Boundary Properties Using Stochastic Differential Equations"*, Journal of Applied Mathematics *(to appear)*

A. Atalla and A. Jeremic, *"Modeling the Capillary Exchange Using Coupled Stochastic-Navier Stocks Model"*, Physical Review E. *(submitted)*

Conference Papers

A. Atalla and A. Jeremic, *"Estimation of Boundary Properties Using Stochastic Differential Equations and COMSOL"*, COMSOL Conference 2009.

A. Atalla and A. Jeremic, *"Modeling the Bacterial Clearance in Capillary Network Using Coupled Stochastic-Differential and Navier-Stokes Equations"*, COMSOL Conference 2009.

A. Atalla and A. Jeremic, *"Estimation of Boundary Properties Using Stochastic Differential Equations"*, Canadian Conference on Electrical and Computer Engineering, CCECE 2009, pp 385-389.

A. Atalla and A. Jeremic, *"An Inverse Model for Localization of Low-diffusivity Regions in the Heart Using ECG/MCG Sensor Arrays"*, BIOSIGNALS 2008, Volume 2, pp 508-51.

A. Atalla and A. Jeremic, *"Localization of Chemical sources Using Stochastic Differential Equations"*, IEEE International Conference on Acoustics, Speech and Signal Processing, pp 2573-2576.

A. Atalla and A. Jeremic, *"Localization of Chemical Sources Using Stochastic Differential Equations in Realistic Environments"*, COMSOL Conference 2008.

References

Prof. Aleksandar Jeremic	PhD. Thesis Supervisor and Teaching Assistant Supervisor McMaster University, Canada Electrical and Computer Engineering Dept +1 (905) 525-9140 x27894 jeremic@ece.mcmaster.ca
Prof. Mohamed Bakr	Supervisory Committee Member and Graduate Instructor McMaster University, Canada Electrical and Computer Engineering Dept +1 (905) 525-9140 x24079 mbakr@ece.mcmaster.ca
Prof. Tharwat Fawzi	Master's Thesis Supervisor, Teaching Assistant Supervisor, and Graduate Instructor Cairo University, Egypt Electrical Power and Machines Dept Cell: +20 (12) 398-5138 tharwat_fawzi@yahoo.com http://staff.eng.cu.edu.eg/ShowInstructorData.aspx?iid=1072
Prof. Amr Adly	Teaching Assistant Supervisor and Undergraduate Instructor Cairo University, Egypt Electrical Power and Machines Dept Office: +20 (2) 3567-8869 amradly@ieee.org

Eng. Mehrzad Shahouei, P.Eng	Mechanical Engineer Voith Hydro Inc. 2185 North Sheridan Way Mississauga, ON L5K 1A4, Canada +1 905 287 5814 Mehrzad.Shahouei@Voith.com